FUTV4812A Multiplexer Scrambler

User's Manual

NMS Version: NMS 5.0.20

Software: 0.55

Hardware: 1.6

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Chapter 1 Product Outline

1.1 Outline

FUTV4812A is the latest multiplexer scrambler designed by FMUSER Company. Its module design of ASI input multiplexer scrambler provides 8 channels ASI input interface(multiplexing and scrambling 8 channels ASI), 2 groups of ASI standalone output interface and 2 corresponding IP output (RJ45 interface). In conclusion, its high integration, high performance and cost effective design make this device widely used in the Newly Generation of CATV Broadcasting system.

1.2 Features

- Module design, 8 channels input interface for user to combine randomly(optional ASI or tuner input)
- Fully support DVB general scrambling system description ETR289, ETSI 101 197 and ETSI 103 197 simulcrypt standards.
- Support TS over UDP protocol, unicast and multicast, IGMP V2/V3
- Multiplex the input TS and output through two channels.
- Support multiplexing TS from input and output. Maximum 256 PID remapping of each channel.
- Support PCR accurate adjusting
- GE port supports 1 Gbps data output channel
- Support PSI/SI editing and inserting
- Support two channels scrambling simultaneously. Each scrambling channel support 4 simulcrypt CA

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- Support NMS(network management system)
- Support LCD panel management

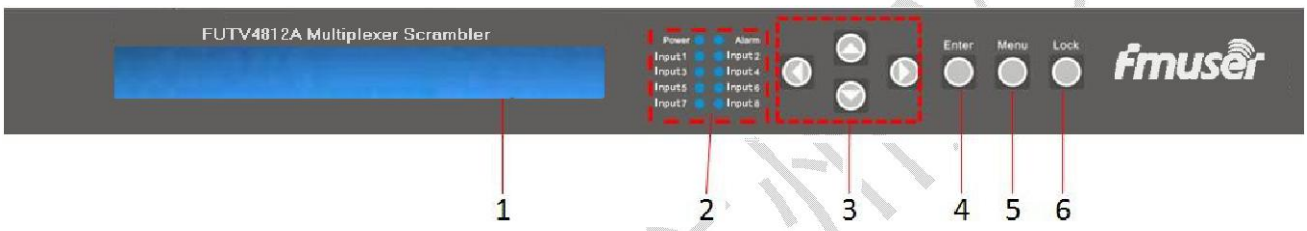
1.3 Specifications

Input interface		8 BNC interface
Multiplex	Input channel	8 channels ASI input
	Output channel	2 groups of standalone ASI output and 2 corresponding IP output
	Maximum PID remapping	256 per input channel
	Function	PID remapping(automatically or manually)
		PCR accurate adjusting
		Generate PSI/SI table automatically
Scrambling parameters	Maximum support simulcrypt CA	4
	Standard	ETSI 101 197,ETSI 103 197
	Way of Connection	Local/Remote connect
IP output	Interface	RJ45
	Output Protocol	TS over UDP protocol
	Output Bit-rate	1-108Mbps per output channel
ASI output	Interface	4 BNC interface
	Output form	TS
	Output bit-rate	1-108Mbps per output channel
System	Support NMS and LCD panel management	
General	Demission (W x L x H)	482mm×455mm×44.5mm
	Weight	2.5kg

	Temperature	0~45℃(operation)，-20~80℃(storage)
	Power supply	AC 110V±10%，50/60Hz Or AC 220V±10%，50/60Hz
	Consumption	≈15.4W

1.4 Appearance and description

Front panel Illustration:

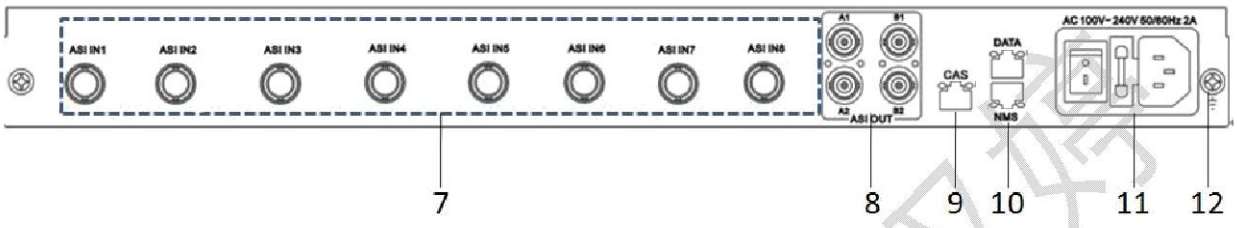


Indicator area: All the indicators will light on when FUTV4812A multiplexer scrambler works at its current mode.

1		LCD Display
2	ASI IN	Power Indicator
		Alarm Indicator
		ASI 1: when the input signal of ASI 1 is locked, the light is green. Otherwise it becomes red.
		ASI 2: same as ASI 1
		ASI 3: same as ASI 1
		ASI 4: same as ASI 1
		ASI 5: same as ASI 1
		ASI 6: same as ASI 1
		ASI 7: same as ASI 1
		ASI 8: same as ASI 1
3		UP/ DOWN /LEFT/RIGHT Key

4	Enter: Confirmation key
5	MENU Key
6	LOCK Key

Rear panel Illustration:



7	ASI In	ASI IN1: TS input of port 1
		ASI IN2: TS input of port 2
		ASI IN3: TS input of port 3
		ASI IN4: TS input of port 4
		ASI IN5: TS input of port 5
		ASI IN6: TS input of port 6
		ASI IN7: TS input of port 7
		ASI IN8: TS input of port 8
8	ASI OUT	A1: TS output of port A1
		A2: TS output of port A2
		B1: TS output of port B1
		B2: TS output of port B2
9		CAS port：for connection with CAS system
10		Data port: 1GE Port Output NMS Ethernet Port (10-100Mbps)
11		Power switch, fuse, socket
12		Grounding pole

Chapter 2 Installation Guide

2.1 Acquisition Check

When user opens the package of the device, it is necessary to check items according to packing list. Normally it should include the following items:

- FUTV4812A multiplexer scrambler
- User's Manual
- ASI Cable
- Power Cord

If any item is missing or mismatching with the list above, please contact local dealer.

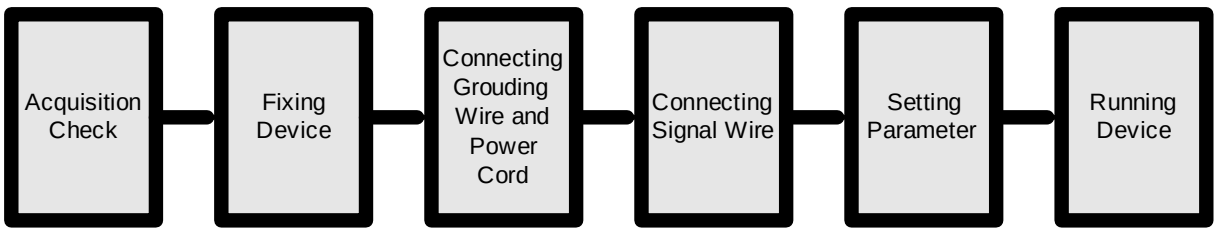
2.2 Installation Preparation

When users install device, please follow the below steps. The details of installation will be described at the rest part of this chapter. Users can also refer rear panel chart during the installation.

The main content of this chapter includes:

- Checking the possible device missing or damage during the transportation
- Preparing relevant environment for installation
- Installing multiplexer scrambler
- Connecting signal cables
- Connecting communication port (if it is necessary)

2.2.1 Device's Installation Flow Chart Illustrated as following：



2.2.2 Environment Requirement

Item	Requirement
Machine Hall Space	When user installs machine frame array in one machine hall, the distance between 2 rows of machine frames should be 1.2~1.5m and the distance against wall should be no less than 0.8m.
Machine Hall Floor	Electric Isolation, Dust Free Volume resistivity of ground anti-static material: $1X10^{7}$~$1X10^{10}\Omega$，Grounding current limiting resistance: 1MΩ (Floor bearing should be greater than 450Kg/㎡)
Environment Temperature	5~40℃(sustainable)，0~45℃(short time)， installing air-conditioning is recommended
Relative Humidity	20%~80% sustainable 10%~90% short time
Pressure	86~105KPa
Door & Window	Installing rubber strip for sealing door-gaps and dual level glasses for window
Wall	It can be covered with wallpaper, or brightness less paint.
Fire Protection	Fire alarm system and extinguisher
Power	Requiring device power, air-conditioning power and lighting power are independent to each other. Device power requires AC power 100V-240V 50Hz. Please carefully check before running.

2.2.3 Grounding Requirement

l All function modules' good grounding is the basis of reliability and stability of devices.

Also, they are the most important guarantee of lightning arresting and interference rejection. Therefore, the system must follow this rule.

- ASI cable's outer conductor and isolation layer should keep proper electric conducting with the metal housing of device.
- Grounding conductor must adopt copper conductor in order to reduce high frequency impedance, and the grounding wire must be as thick and short as possible.
- Users should make sure the 2 ends of grounding wire well electric conducted and be antirust.
- It is prohibited to use any other device as part of grounding electric circuit
- The area of the conduction between grounding wire and device's frame should be no less than 25mm^2.

2.2.4 Frame Grounding

All the machine frames should be connected with protective copper strip. The grounding wire should be as short as possible and avoid circling. The area of the conduction between grounding wire and grounding strip should be no less than 25mm^2.

2.2.5 Device Grounding

Connecting the device's grounding rod to frame's grounding pole with copper wire.

2.3 Wire's Connection

The grounding wire conductive screw is located at the right end of rear panel, and the power switch, fuse, power supply socket is just beside ,whose order goes like this, power switch is on the left ,power supply socket is on the right and the fuse is just between them.

- Connecting Power Cord

  User can insert one end into power supply socket, while insert the other end to AC power.

- Connecting Grounding Wire

  When the device is solely connected to protective ground, it should adopt independent way, say, share the same ground with other devices. When the device adopts united way,

the grounding resistance should be smaller than 1Ω.

F Caution:

Before connecting power cord to FUTV4812A multiplexer scrambler, user should set the power switch to "OFF".

2.4 Signal Cable Connection

The signal connections include the connection of input signal cable and the connection of output signal cable. The details are as follows:

2.4.1 ASI In and ASI out connection:

l ASI Input Connection

User can find ASI input port on the device according to connector mark described in the rear panel illustration, and then connect the ASI cable (in the accessories). One end is connected to the Multiplexer-Scrambler's ASI input port, while the other end is connected to Encoder's ASI output port or ASI output port of other equipment.

l ASI Output Connection

User can find ASI output port on the device according to connector mark described in the rear panel illustration, and then connect the ASI cable (in the accessories); one end is connected to the Multiplexer-Scrambler's ASI output port and the other end to the Modulator's ASI input port or ASI input of other equipment. Multiplexer-Scrambler's ASI cable illustrated as follows:

2.4.2 Network cable (Category 5) illustration:

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Chapter 3 Operation

FUTV4812A multiplexer scrambler's front panel is user operation interface. The detailed operations go as follows:

Keyboard Function Description:

MENU: Canceling presently entered value, resuming previous setting; Return to previous menu.

ENTER: Activating the parameters which need modifications, or confirming the change after modification.

LEFT/RIGHT: To choose and set the parameters.

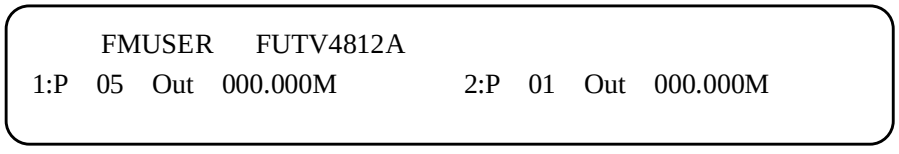
UP/DOWN: Modifying activated parameter or paging up/down when parameter is inactivated.

LOCK: Locking the screen / canceling the lock state. After pressing lock key, the system will question the users to save present setting or not. If not, the LCD will display the current configuration state.

At the page of 5.2 "Load default CFG", user can firstly press "ENTER" key, consequently system resumes factory parameter setting.

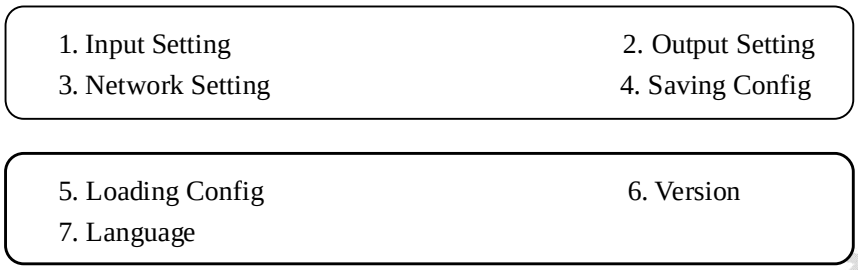
3.1 Main interface

After switching on the multiplexer scrambler, the LCD will display the company name and the device name in the first row, while the output program amount and real-time bit-rate of both output Ports are displayed in the second row.



3.2 General setting

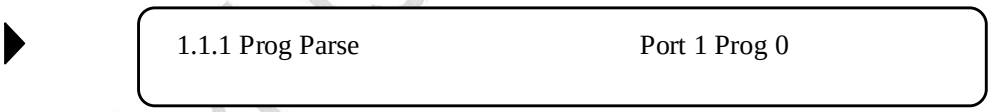
By pressing “LOCK” key to enter the main menu, the LCD will display the following pages:



3.2.1 Input Setting

User can press “Enter” key to enter into the menu of input setting.

Here we take port 1.1 port (ASI) as an example: Press “Enter” key to enter into the menu of 1.1 port (ASI).



At the submenu 1.1.1, the first row displays the port number and input program number, for example, Port 1 means the TS stream comes from port 1 and the “Prog 0” means the input number of the programs is 0.

The descriptions of other ports (1.2 Port-1.8 Port) are the same with 1.1 Port.

3.2.2 Output Setting

User can press “enter” key to enter into the menu of output setting.

User can set the parameters of ASI and IP output in this submenu.

3.2.2.1 Output 1

3.2.2.1.1 Output Stream

User can set the total output bit-rate at this menu. The value of this bit-rate includes the following, the effective bit-rate of multiplexed programs from all input ports and the bit-rate of stuffed null pockets.

3.2.2.1.2 TransStream ID

This is a 16-bit field which serves as a label for identification of the out TS. The value ranges from 0 to 0xFFFF.

3.2.2.1.3 Output IP Enable

At this submenu, user can decide whether to enable or disable IP output of port A.

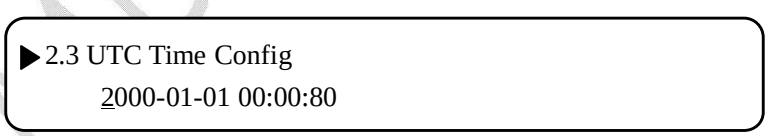
3.2.2.1.4 Output Address

User can check and set the IP output address at this submenu.

3.2.2.1.5 Output Port

NOTE: The description and settings of 2.2 PORT 2 are the same as the 2.1 PORT 1.

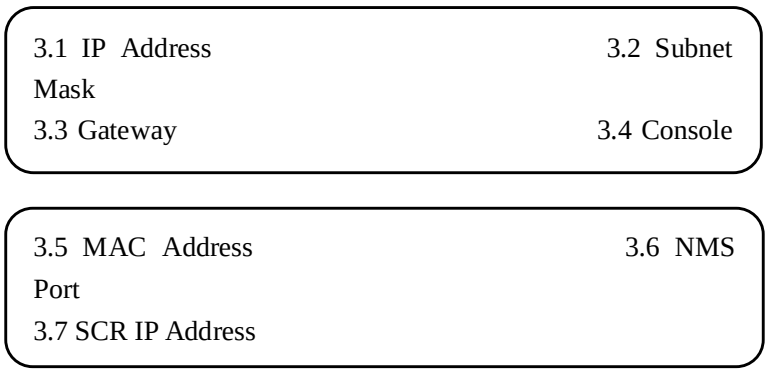
3.2.2.3 UTC Time Config



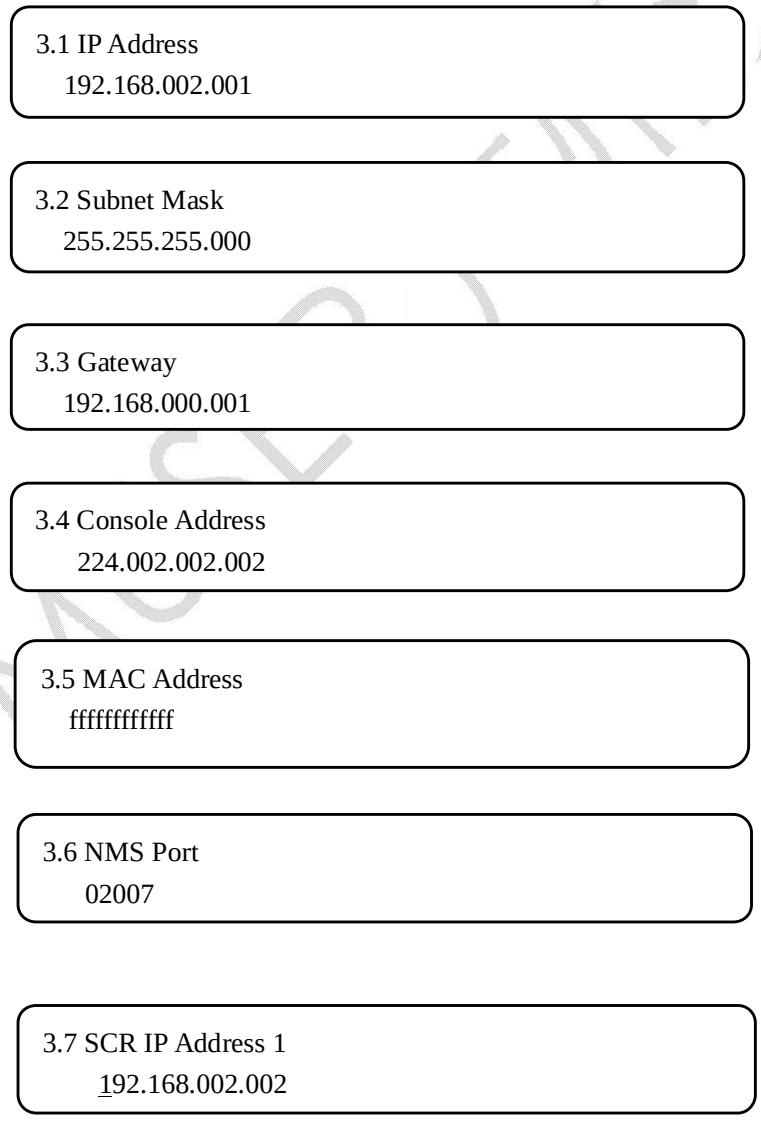
User can set the UTC time (Coordinated Universal Time) at this submenu.

3.2.3 Network Setting

Return to the main interface and select Network Setting by pressing ENTER to set the parameters. The system displays following pages.



Enter to the submenus, under which there are parameters which can be set manually; user can press “Up/Down” to choose this item. “Enter” and “Left/Right” to set the parameters. The system displays following pages.

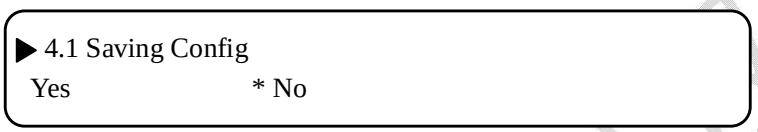


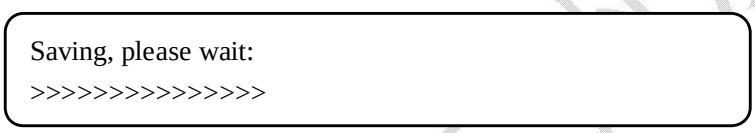
Note:

1. The 10/100Mbps Network port is for NMS controlling only. User can set the device's NMS networking parameters in the series of submenus.
2. The MAC address is according to the factory setting, and it's unique.
3. NMS port can be used as communication port for NMS management.

3.2.4 Saving Config

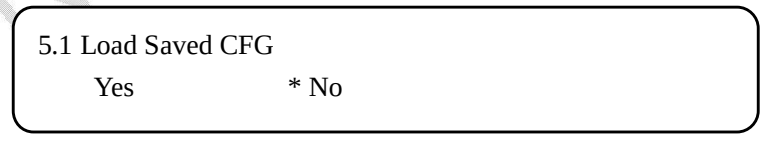
User can choose NO or YES to save the current configuration parameters at this menu.

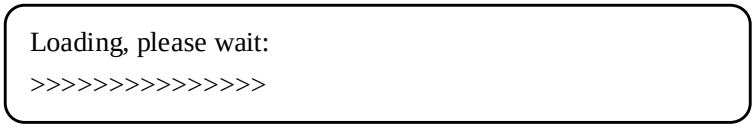




3.2.5 Loading Config

User can restore the device into the last saved configuration by choosing the menu 5.1 "Load Saved CFG", and also user can restore the device into factory configuration by choosing the menu 5.2 "Load Default CFG".

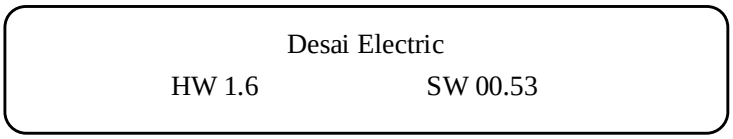




The operation of 5.2 is the same as 5.1.

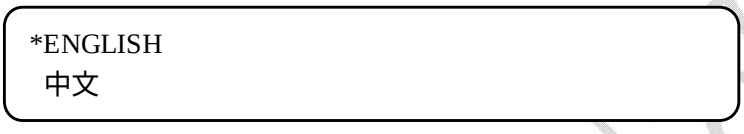
3.2.6 Version

User can check the device's hardware version and software version at this submenu:



3.2.7 Language

User can select the needed language at this submenu:



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Chapter 4 NMS Setting

Network Management System Profile

Network management system is applied to digital TV equipment operation, controlling and management and parameters setting, etc. It centralizes digital TV equipment through network.

4.1 Installation

The software doesn't need special installation. User can just copy "Network Management Software X.XXY.exe" to the specified directory (X.XX is version number, Y represents language. For example: the version number of network management software 4.04E.exe is 4.04 English versions). When the network management software is running, it will generate two files as follows:

- Network management software X.XXY.log (It preserves the log file.)
- Info. Bin (It's the user configuration file.)

4.2 Software Operation

4.2.1 Login Interface

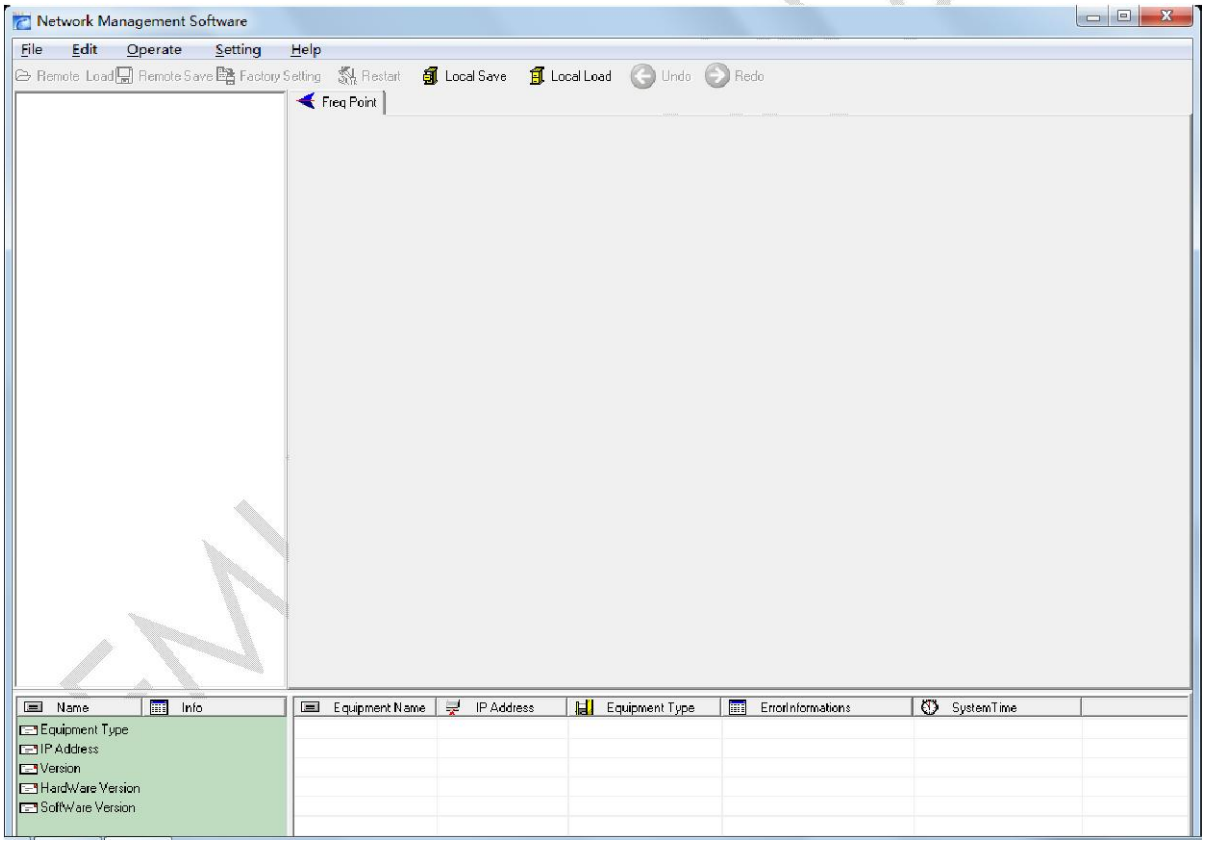
After executing the NMS software, user can input username and password at the pop-up "User Sign In" window.

User can login the NMS by pressing Confirm key after inputting user name and password.

Upon the inputs, the software will verify them with database record automatically. If both of them are correct, the main interface will appear. Both of the default user name and password are **admin**.

4.2.2 Main Interface

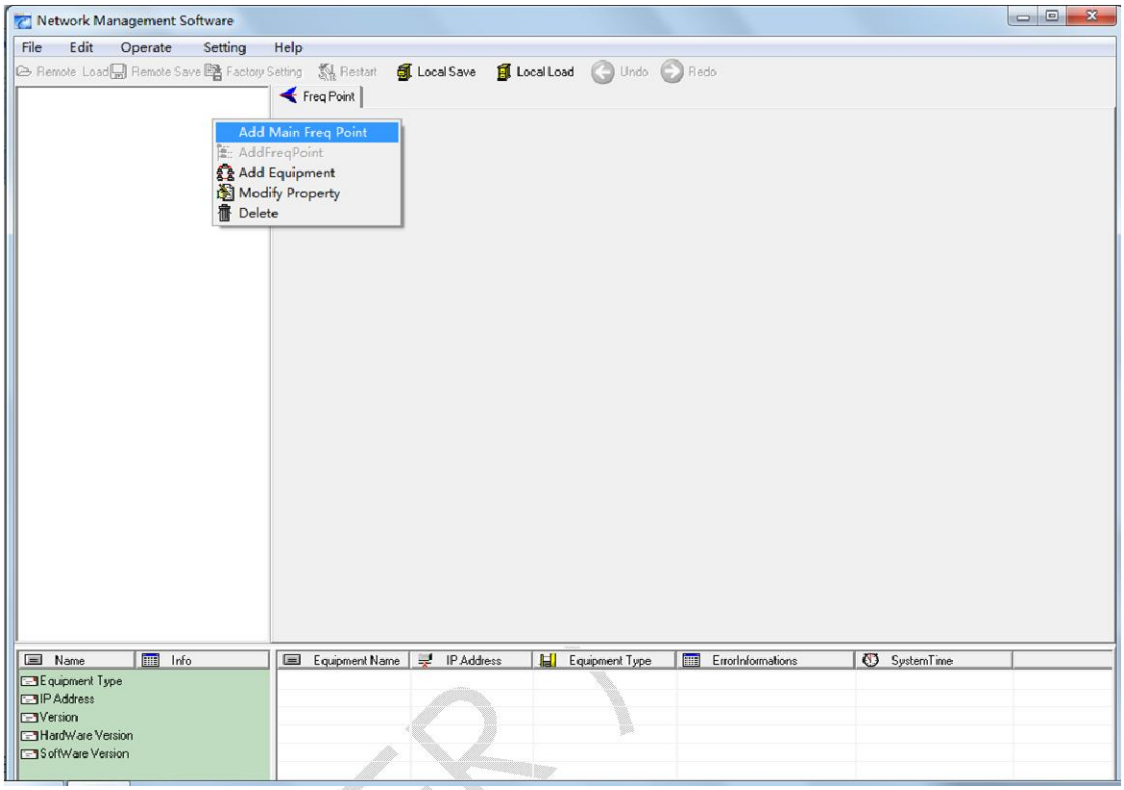
User can create a device node tree in the left column by adding, modifying and deleting the device node. This software provides a powerful node operation function, and the user can edit various parameters in the device tree for management and classification.

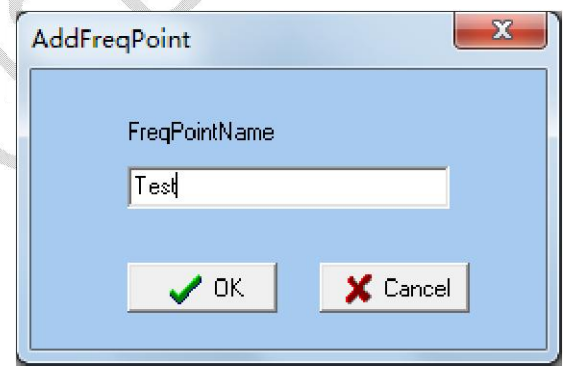


4.2.3 Adding Frequency Point

The Add Freq Point dialog box popes up when the user clicks the **Add Main Freq Point** item in the Edit pull down menu on the menu row. User can also click right mouse key to pop up

the short-cut menu in device tree or in the left blank column, then the Add Freq Point dialog box popes up by choosing **Add Main Freq Point**. The device will confirm the given frequency while user clicks **OK**.

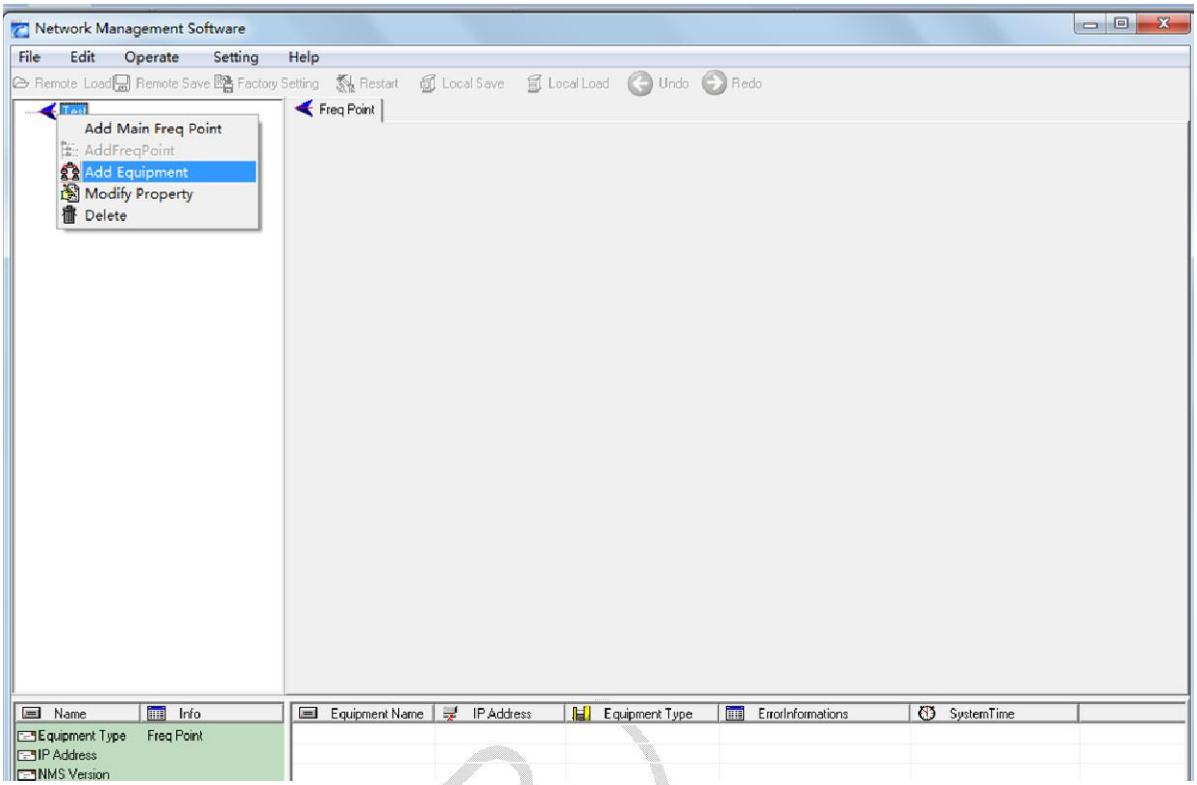




4.2.4 Adding Equipment under Given Frequency Point

User should choose the frequency point in advance, and then the dialog box of Add Equipment will pop up when user clicks **Add Equipment** item in the Edit pull-down menu on the menu row or clicks right mouse key to pop up the short-cut menu in device tree or in the

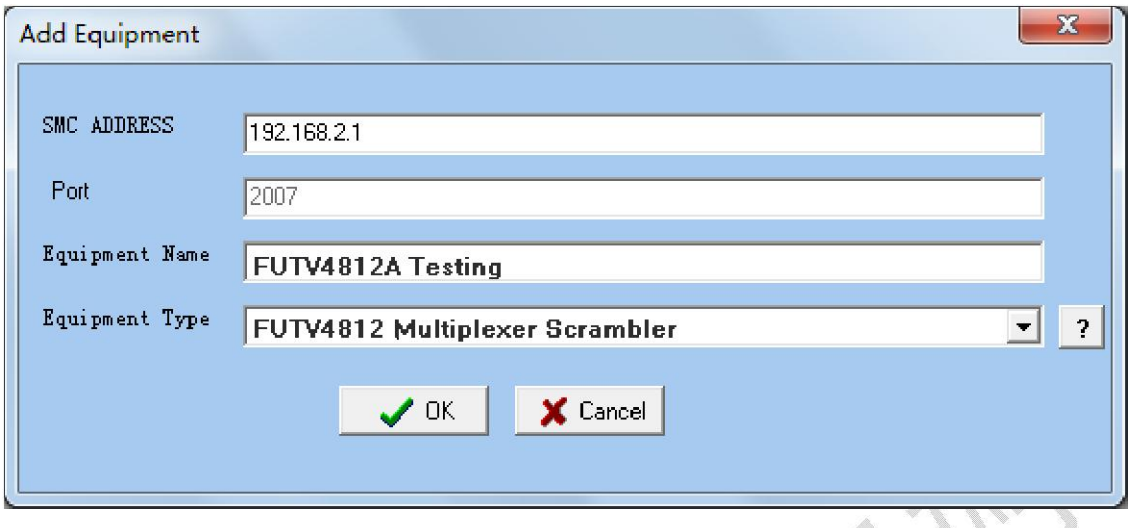
left blank column, then the Add Equipment dialog box popes up by user's choosing **Add Equipment**



4.2.5 Edit Equipment Interface

User should follow the steps as below:

- Inputting the device IP Address
- Inputting the device Port Number
- Inputting the Equipment Name
- Choosing the connected equipment type in drop down list of "Equipment Type" by clicking the "▼" or click "?" button to auto search.

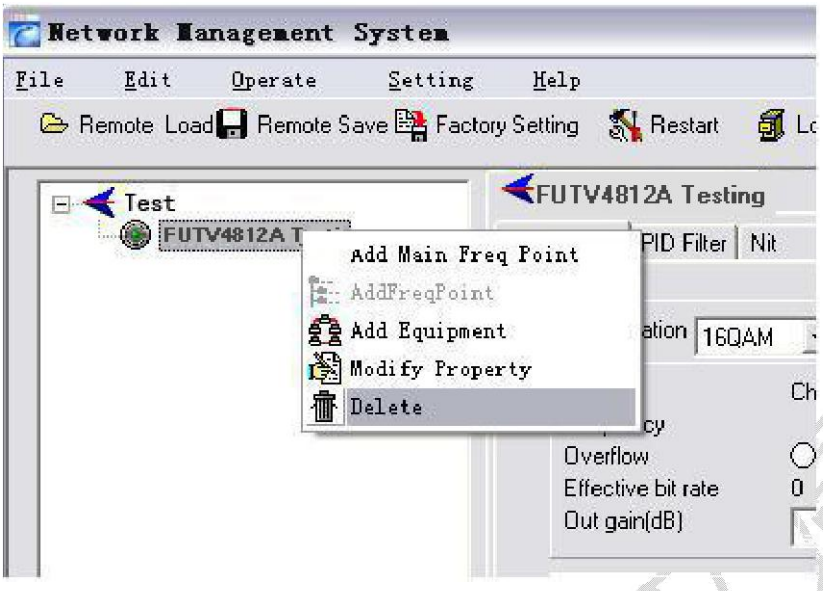


The device will confirm the equipment when user clicks **OK,** and the light turns green if it links the equipment successfully.

NOTE: The default IP of FUTV4812A is 192.168.2.1, also you can check its IP address in the front panel of device (3 Network setting-3.1 IP Address)

4.2.6 Delete Equipment

User can choose the equipment to be deleted in the left column, and then click the “delete” item in the drop down menu which appears by clicking the right mouse key.



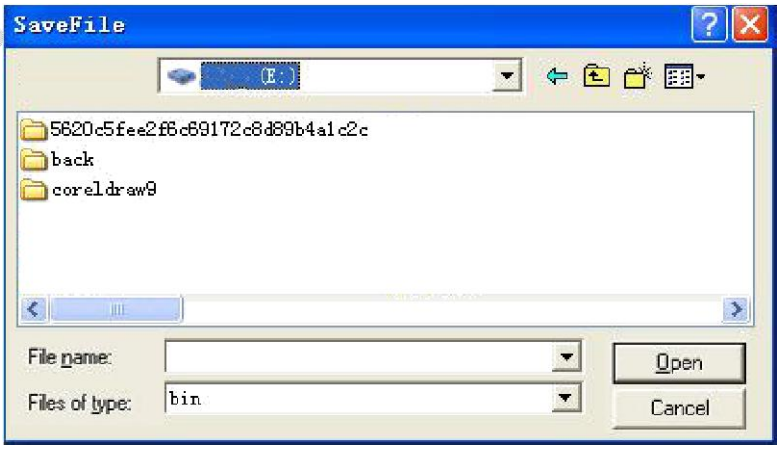
4.2.7 Save Configuration

After finishing all the parameters setting, user can click

button on the toolbar to save the modifications to the device's flash, while user can also reload the saved parameters from device's flash and refresh the device's parameters setting according to the loaded values by clicking

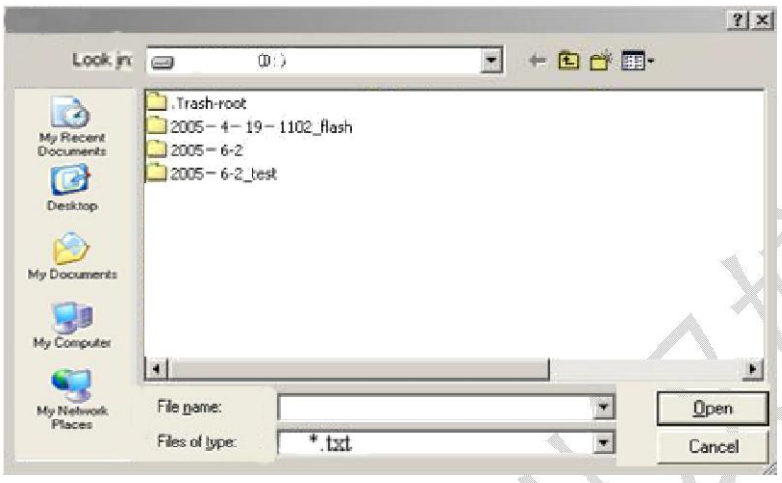
Alternatively, user can also click the

button on the toolbar to popup the "save file" dialog box, which gives prompts to save all the device's parameters as binary files in the computer's hard disk.



Similarly, user can choose to click the

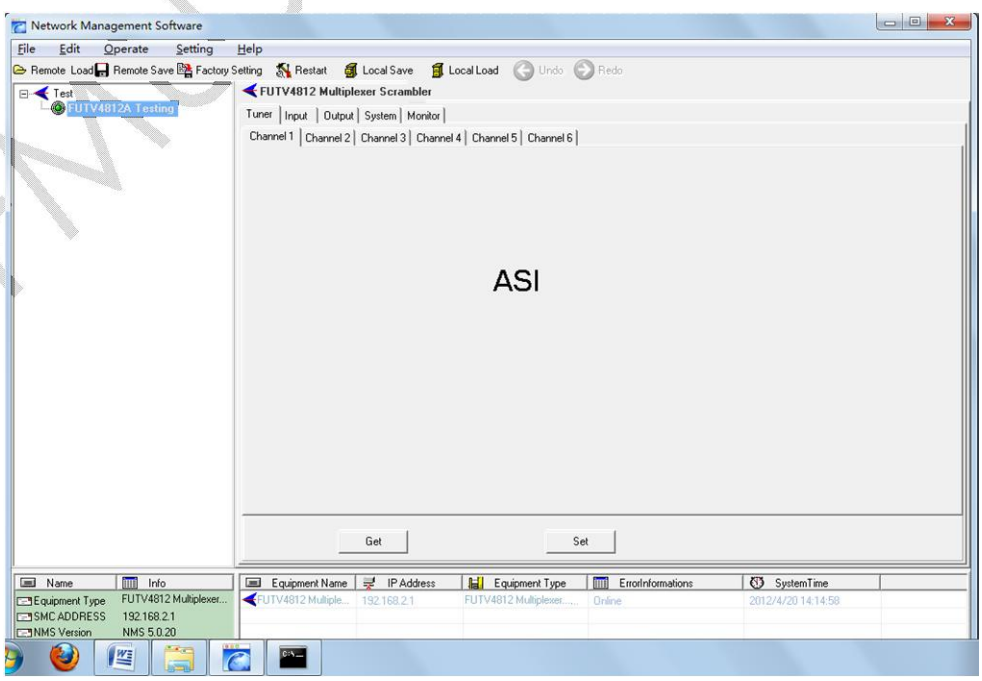
button on the toolbar to popup the read file dialog box, to read the stored binary file and set the device's parameters according to the loaded binary files.



4.3 FUTV4812A multiplexer scrambler Operation

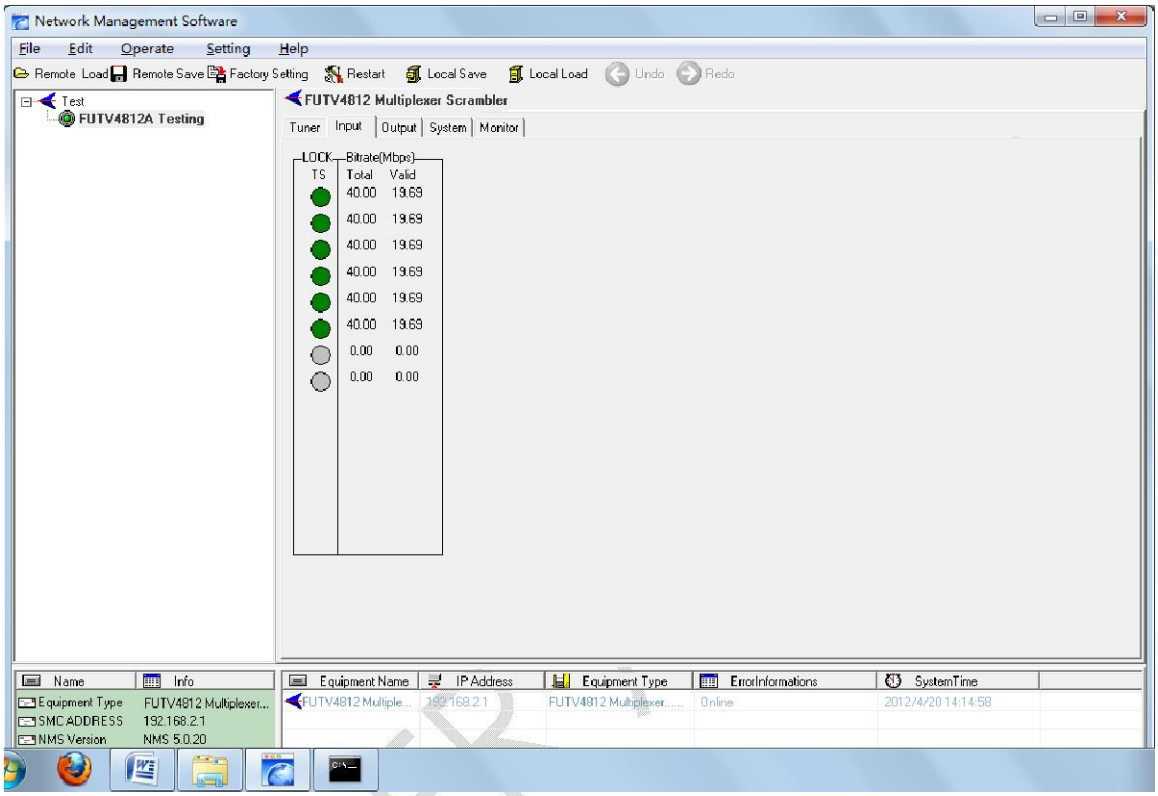
4.3.1 Tuner In

User will see the below interface under the **Tuner** menu. As FUTV4812A multiplexer scrambler has only ASI inputs, this interface is not use. User will operate the ASI inputs under the rest menu.



4.3.2 ASI In Checking

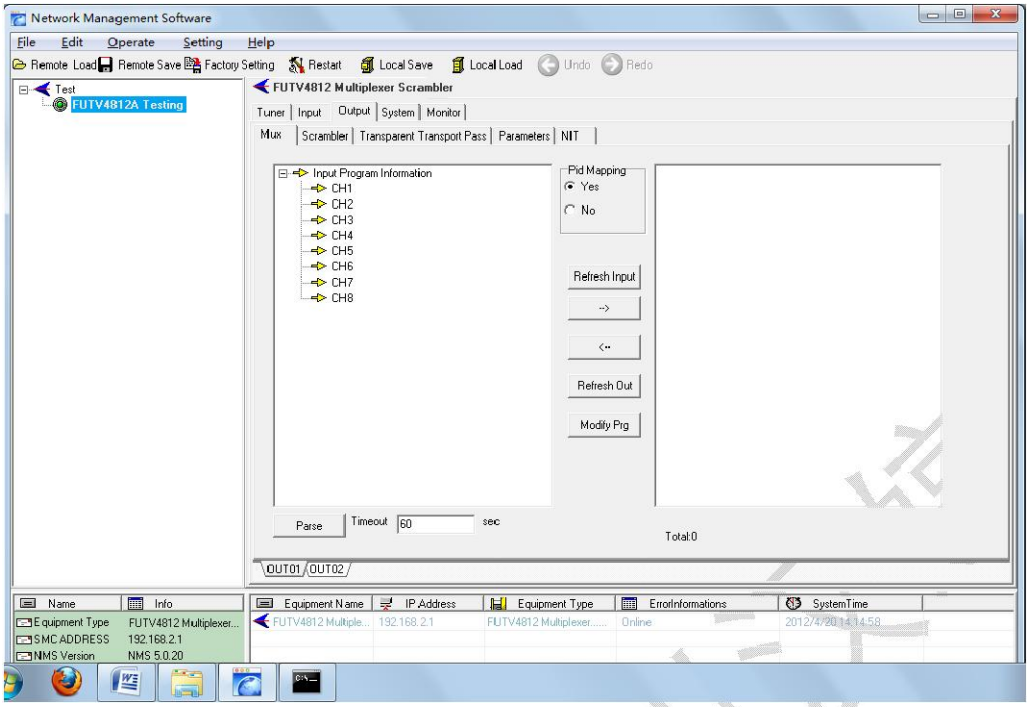
User can click **Input** button and check the TS bit-rate in below interface. The green lights indicate the ASI cables being properly connected.



4.3.3 Output Setting

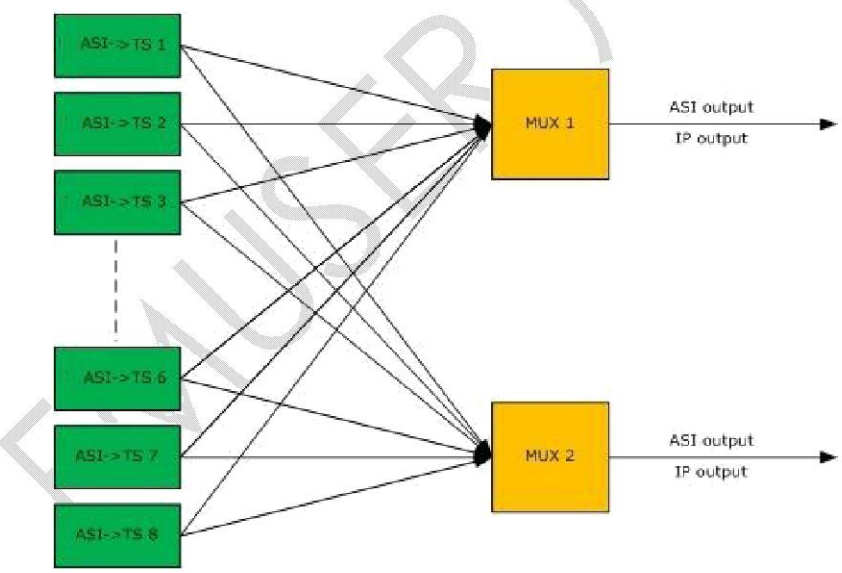
User can click **Output** button and configurate output channel 1

in this part.



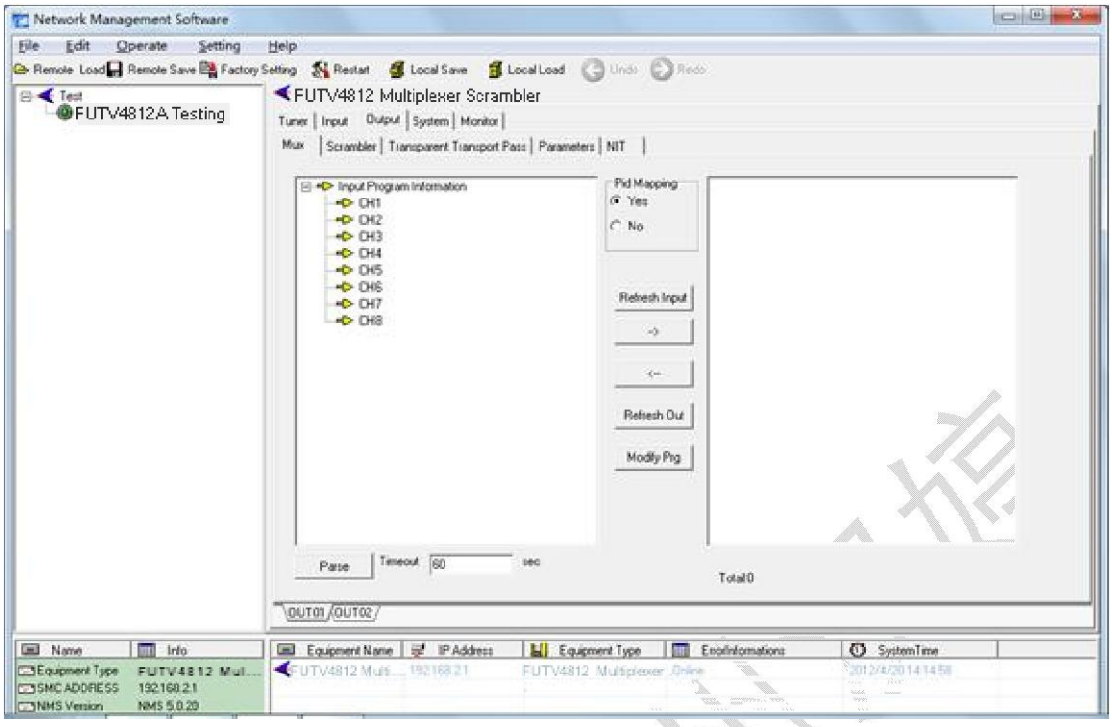
4.3.3.1 Multiplexer setting

4.3.3.1.1 Multiplexing diagram：



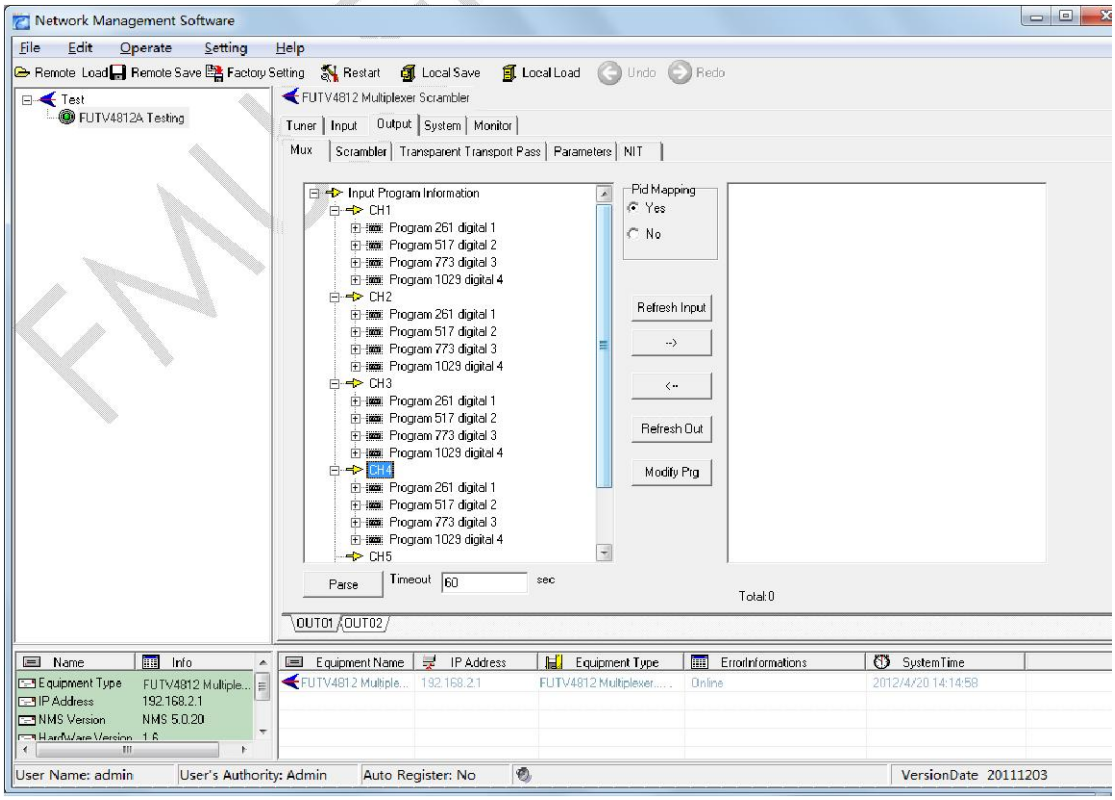
4.3.3.1.2 Refresh Input

The first submenu of Output is Mux shown as below:



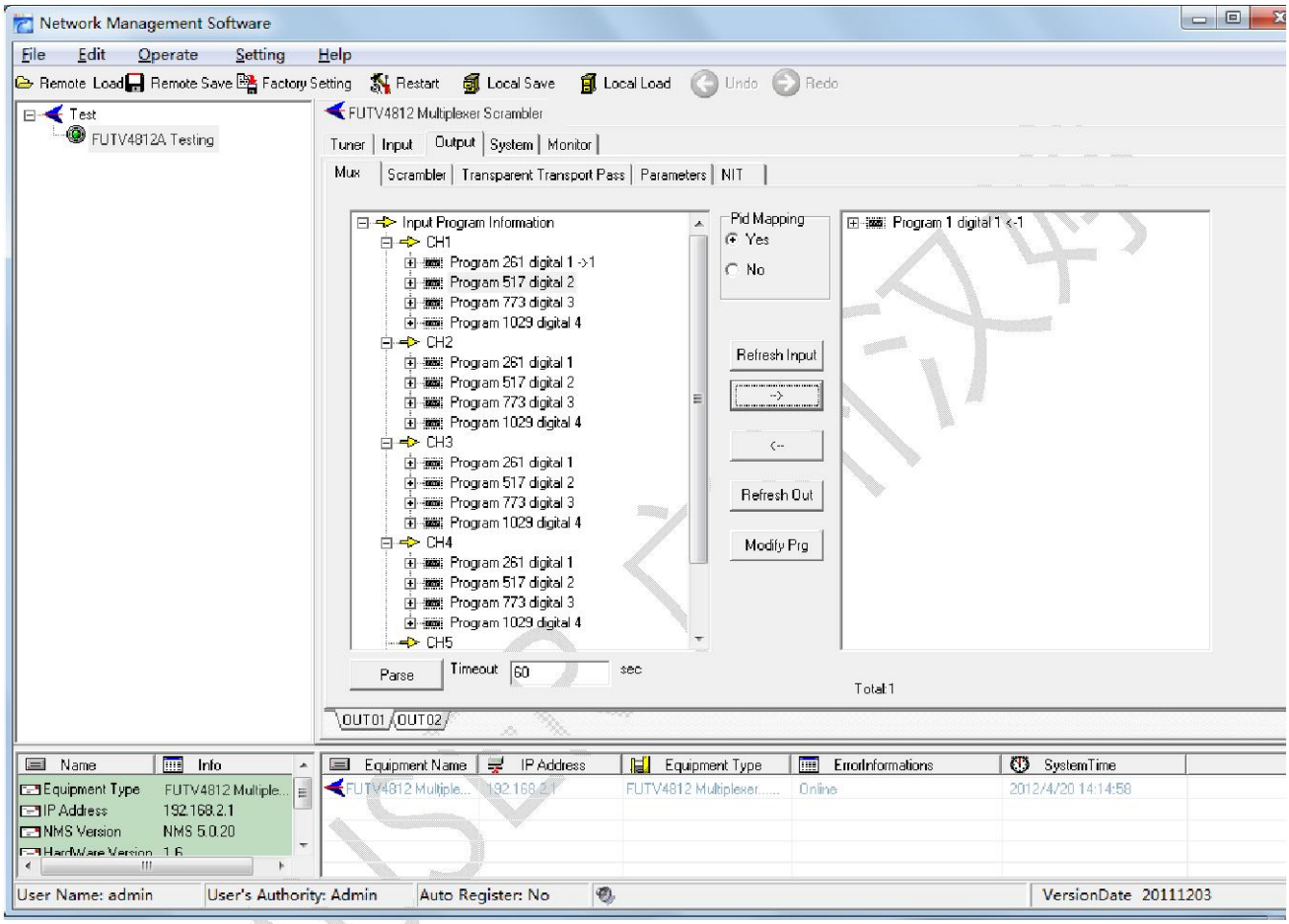
User can select one of the input ports and then click this button to get the program list of this input port.

4.3.3.1.3 Select Program



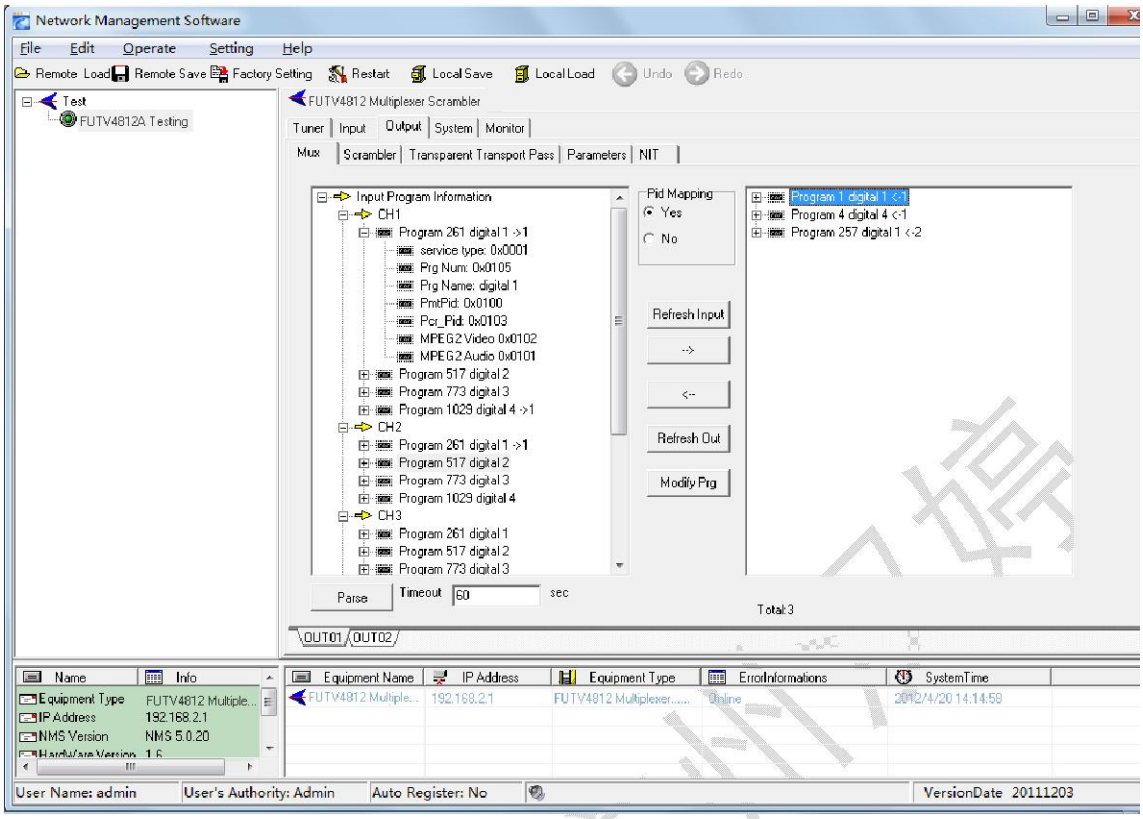
User can User can select the program to be multiplexd and click the arrow to add it to the right box, or user can delete the programs which have been multiplexed from the right box by clicking the arrow

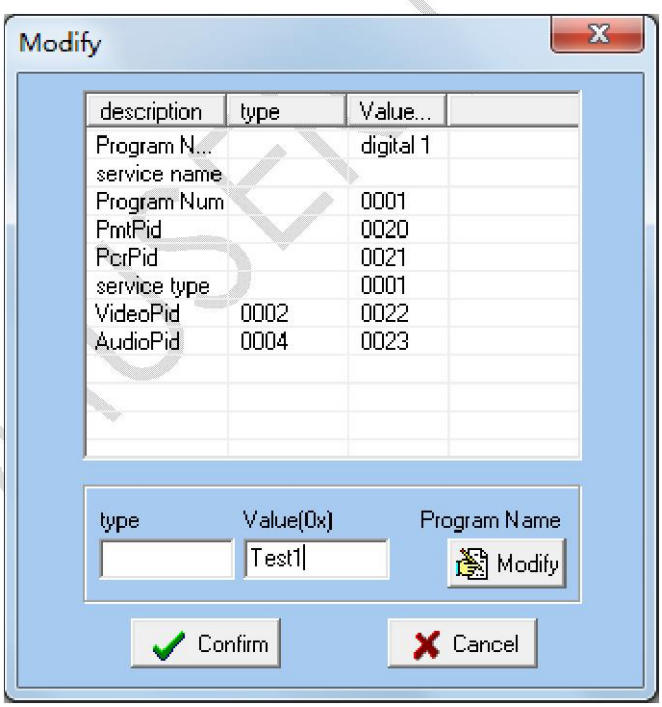
.



4.3.3.1.4 Modify Program

User can trigger a window to modify the program's properties and attributes by selecting the target program and clicking Modify Prg button

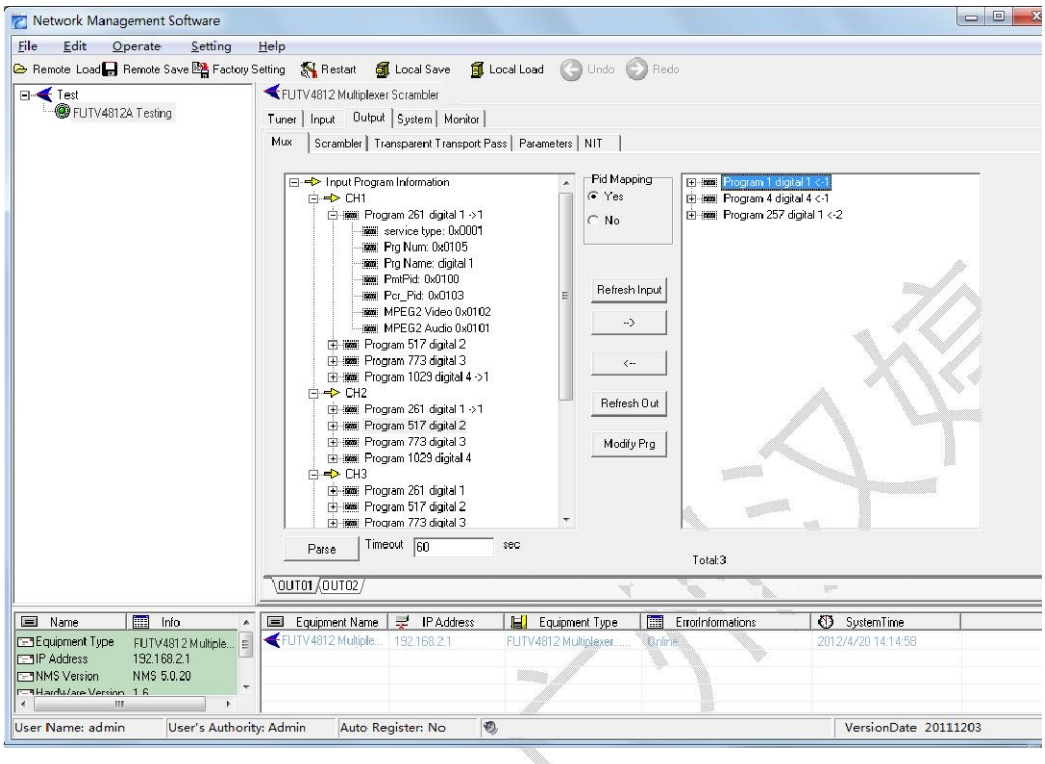




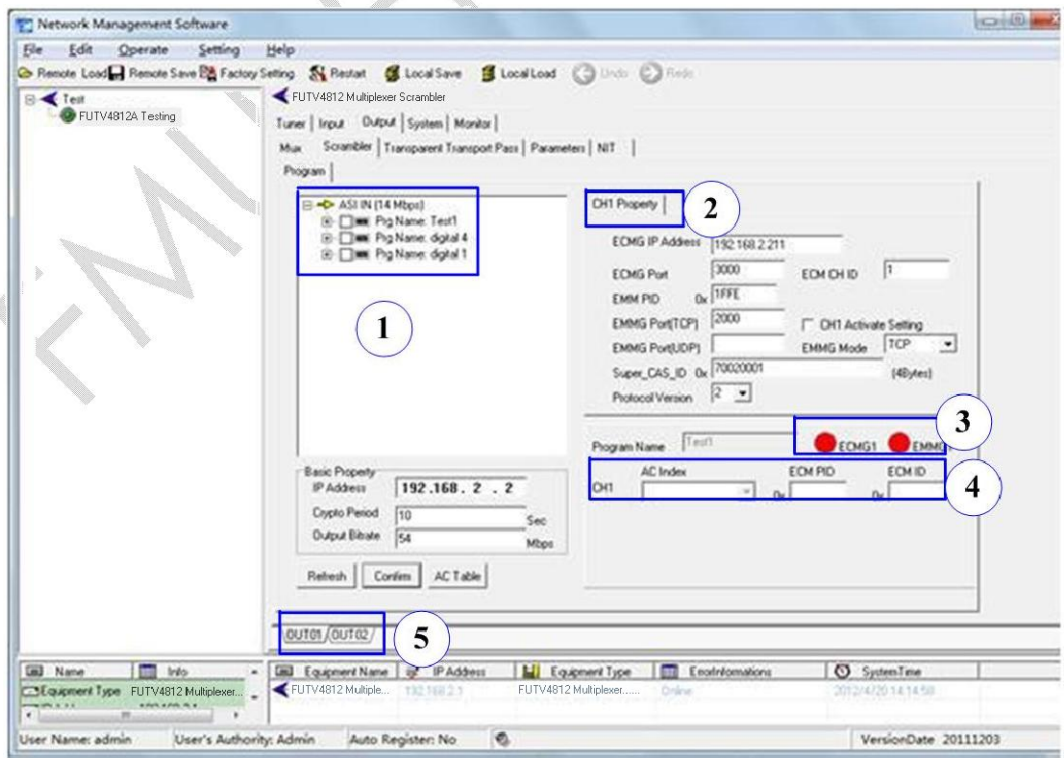
When the modify interface pops out as shown above. User can select the item to be modified and input new information in the corresponding box below. To prosper the modification, pls do click the Modify botton

at right and Confirm botton

Confirm at left corner. The modified programs are displayed in the right box and an illustration for reference is as follows:



4.3.3.2 Scrambler Setting



4.3.3.2.1 General Introduction

1. This field indicates the current outputting programs and their bit rates. The programs selected will indicate to scramble the corresponding programs.

2. CA channel indication

3. The indicators of ECMG and EMMG working state, green means it works normally, while red means communication error or no communication.

4. User can set AC index, ECM PID, ECM ID of the current program. (Usually ECM IP could keep the default parameter)

5. Output channel selecting

4.3.3.2.2 IP Address

This field means the scrambling IP address of the current outputting channels. The scrambling IP addresses of all modules in the network must be different, and the NMS IP addresses of all modules must be different. Otherwise, it will cause IP conflict, and the device will not work normally. Also the Scrambler IP address should be in the same network with CAS system.

4.3.3.2.3 Crypto Period

This field means the scrambling crypto period of the current outputting channels. After the specified crypto period, the CW will be changed to a new one.

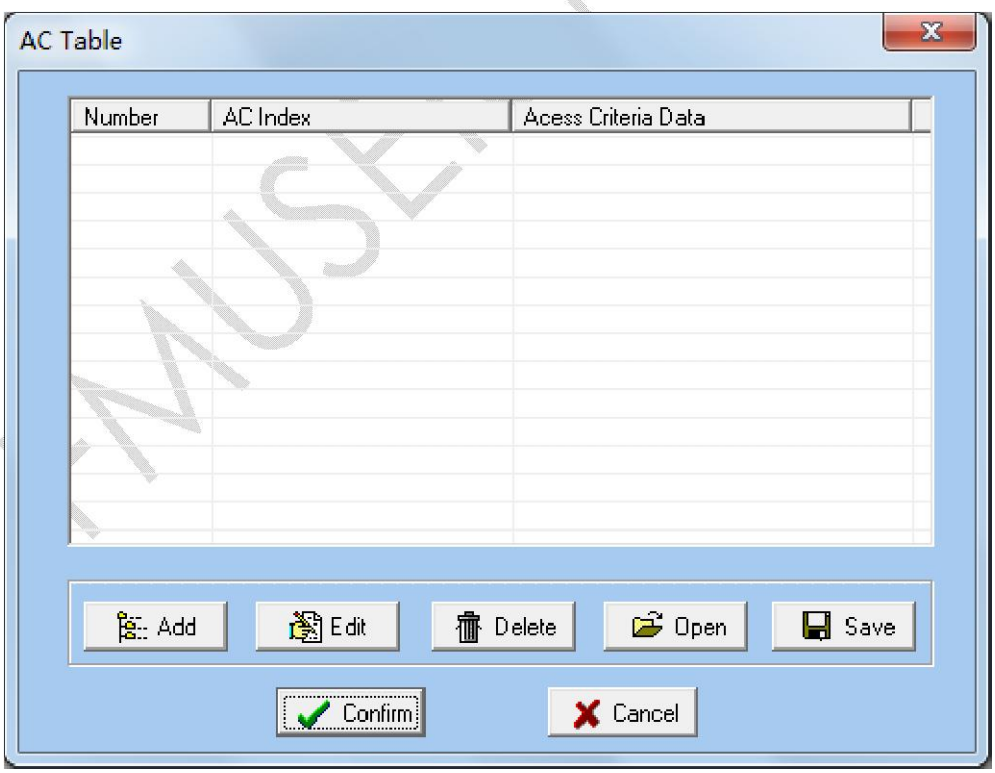
4.3.3.2.4 Output Bit-rate

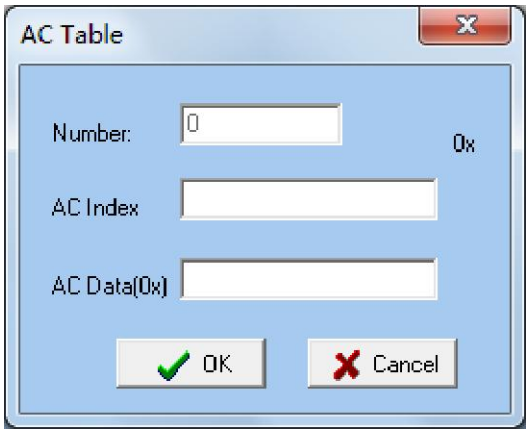
This filed means the TOTAL bit-rate of the current output.

4.3.3.2.4.1 Refresh: Users can refresh device parameter and get the current configuration.

4.3.3.2.4.2 Confirm： Users can submit the current configuration by clicking this button.

4.3.3.2.4.3 AC Table：Editing the AC list and then users can add, modify, open and save the AC data. When clicking it, it will pop up the following interface:

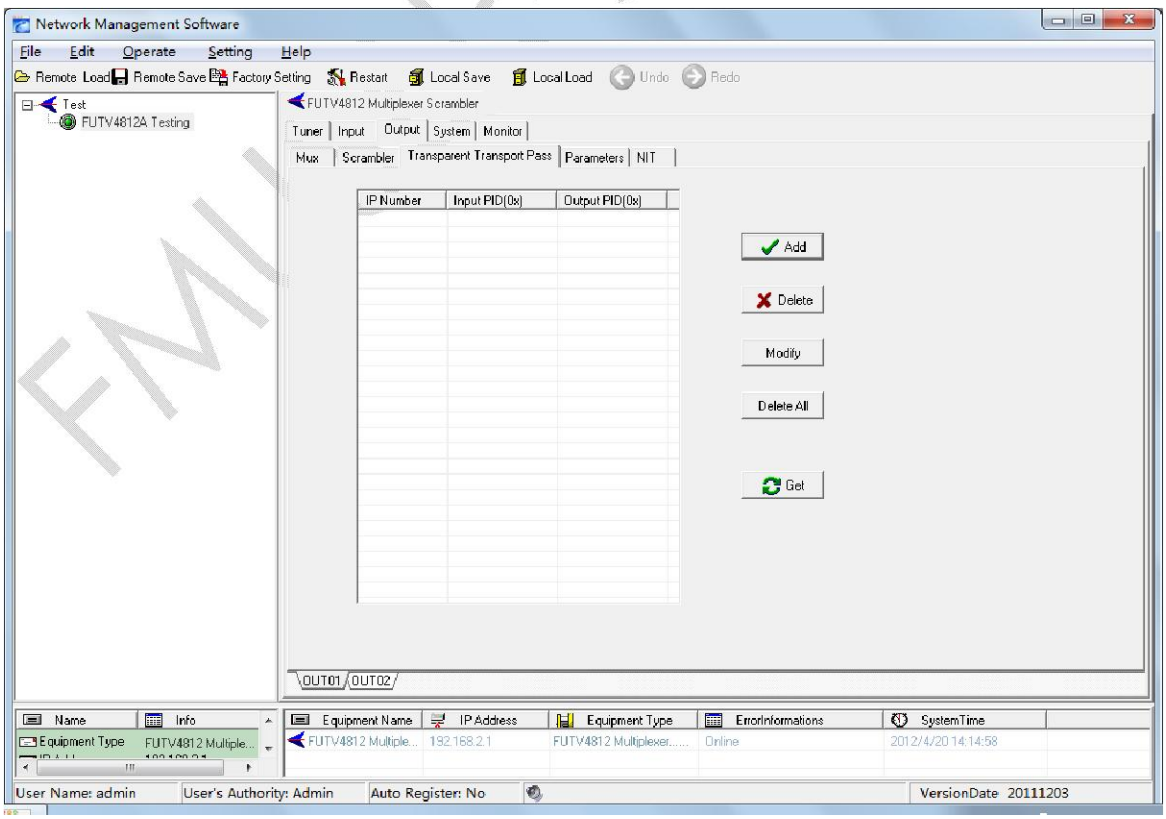




After the modification, users can click the Confirm button to submit the current configuration, and click the Cancel to quit the current operation.

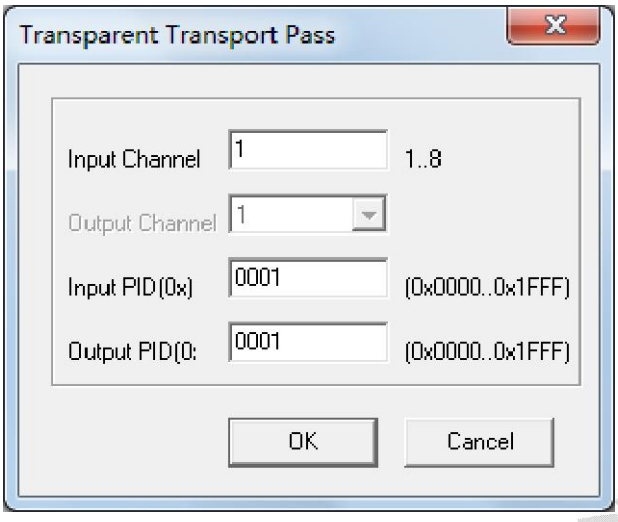
4.3.3.3 Transparent Transport Pass

User can decide to bypass the inputting PID as needed in this interface. This interface can be used pass through the EPG table, STB update data, etc.

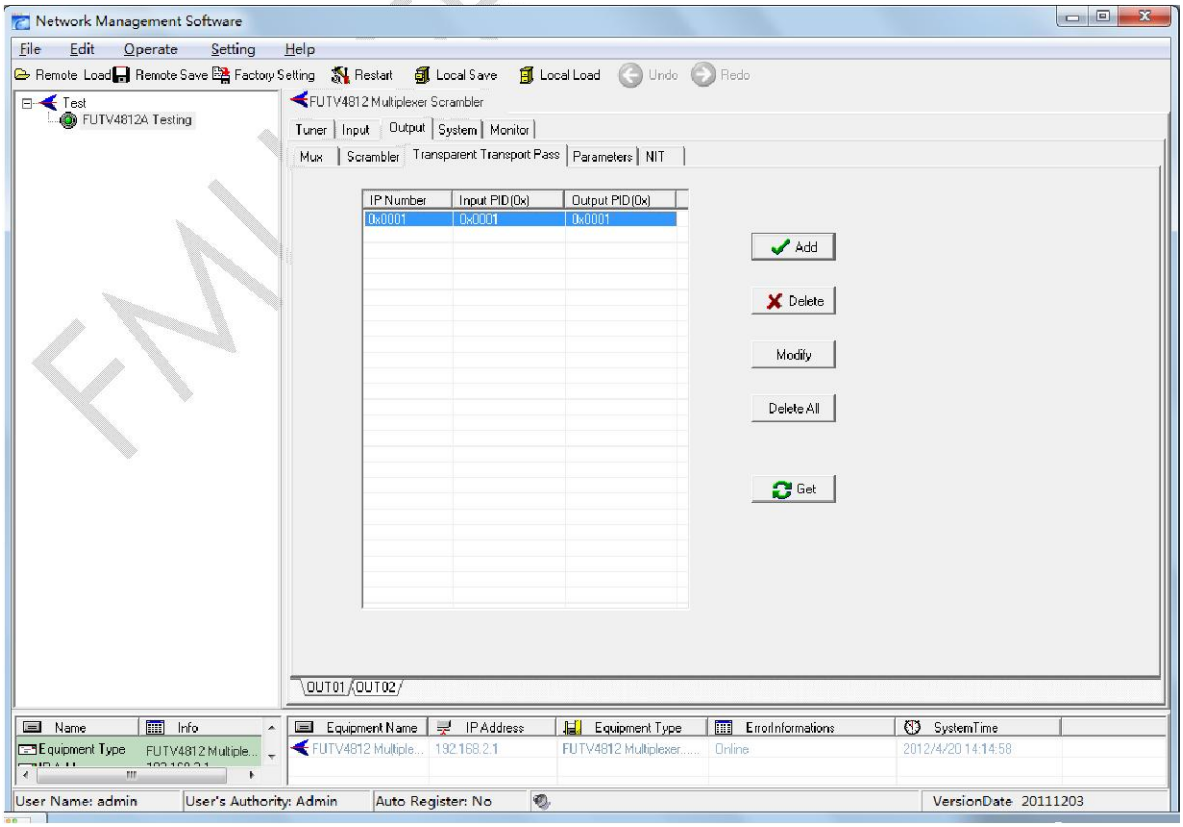


By clicking Add button

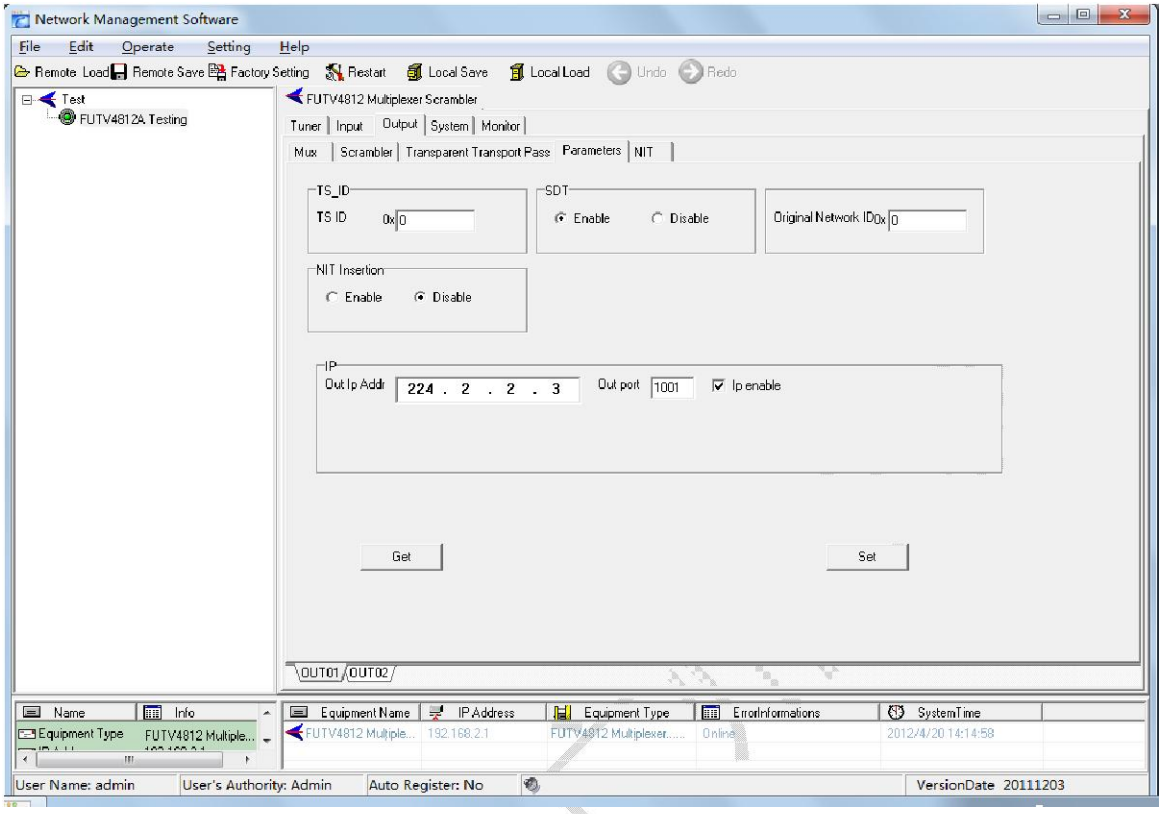
, the below interface will pop out



In this interface, user can input and check the source of PIDs in the first box, the value of PIDs source in the second box and value of outputting PIDs which has been bypassed. Clicking “OK”, user can return to the interface shown as below and proceed to other operations through buttons listed beside.



4.3.3.4 Parameters



User can set the total output bit-rate at this field. The value of this bit-rate includes the following, the effective bit-rate of multiplexed programs from all input ports and the bit-rate of stuffed null pockets.

4.3.3.4.1TS ID

User can set a 16-bit TS ID at this field which serves as a label for identification of the out TS. The value ranges from 0 to 0xFFFF.

4.3.3.4.2 SDT Insertion

User can decide whether to insert the SDT table in the output TS at this field.

4.3.3.4.3 Original Network ID

To set the original network ID from 0 to 0xFFFF

4.3.3.4.4 NIT Insertion

User can decide whether to insert the NIT table in the output TS at this field.

4.3.3.4.5 Out IP address

User can set the output IP address at this field.

4.3.3.4.6 Output Port

User can set the IP output port here.

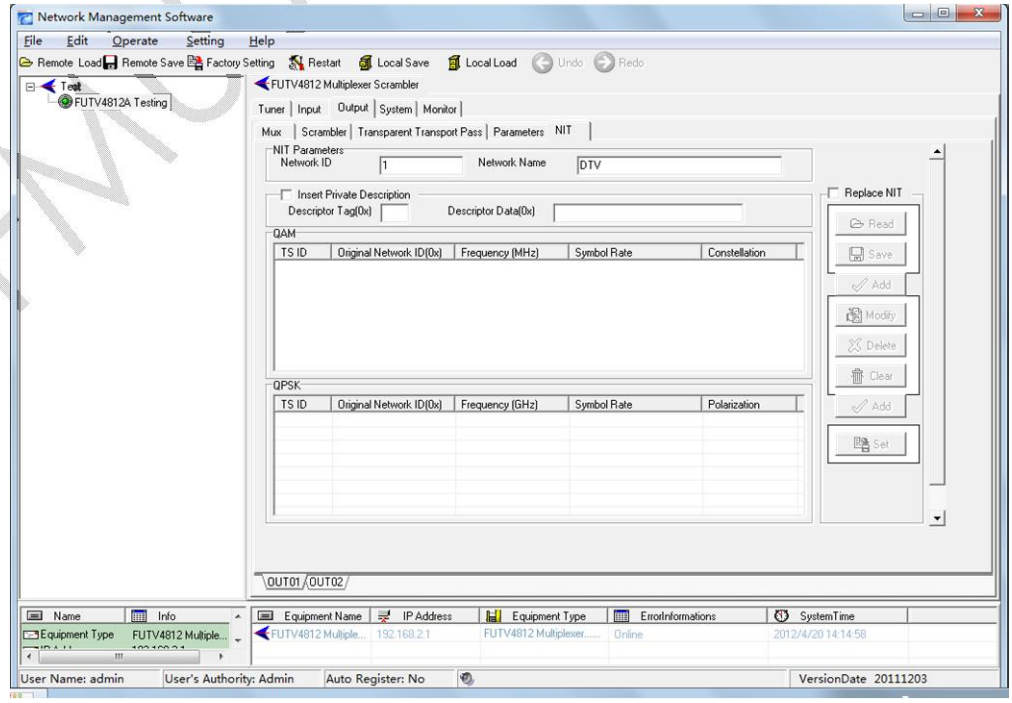
4.3.3.4.7 IP Enable

User can decide whether to enable or disable the IP output at this filed.

4.3.3.5 NIT

NIT: Network Information Table.

NIT table is a very important table for describing the network and TS. Users can set the parameters of the output NIT table on condition that the NIT Insertion in the interface of Parameter is set Enable.

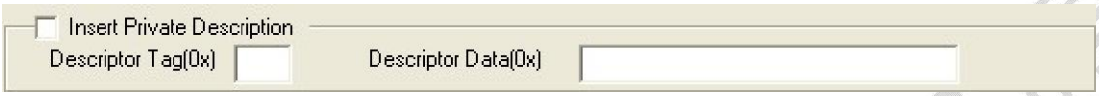


4.3.3.5.1 NIT parameters

Network ID ：The parameter describes the output TS's network ID

Network Name ：The parameter describes the output TS's network name

4.3.3.5.2 Insertion private description



Insert Private Description ：This checkbox will allow user to insert the private descriptor into the output TS. The private descriptor includes two parts. One is descriptor tag, and the other is descriptor information.

Descriptor Tag(0x) ：The descriptor tag is an 8-bit field which identifies each descriptor.

Descriptor Data(0x) ：The detailed information of the private description.

4.3.3.5.3 Replace NIT Table

After checking the checkbox, the NIT editing menu is active. And also the device will insert the EIT table into the output TS.

Replace NIT ：It means to replace the NIT table when users select it, and then users can edit the NIT table and output it.

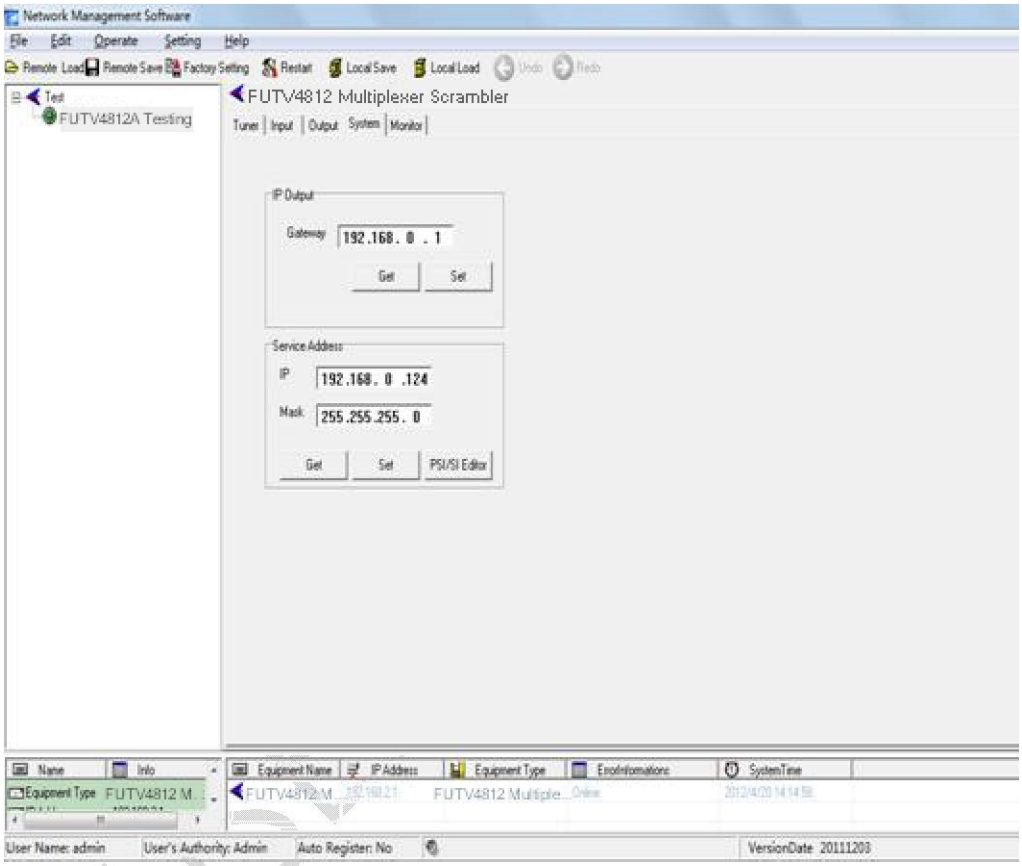
Read and Save ：These two buttons can trigger a window to load/save the saved NIT table file from/to a file on local computer hard disk.

Add ：Users can add the cable transmission descriptor in Add button.

NOTE:

The setting principle for Output 02/03/04 are the same as Output 01.

4.3.4 System Setting



User can set the Outputting IP and Service Address in this part.

Service Address is the data port of IP Address.

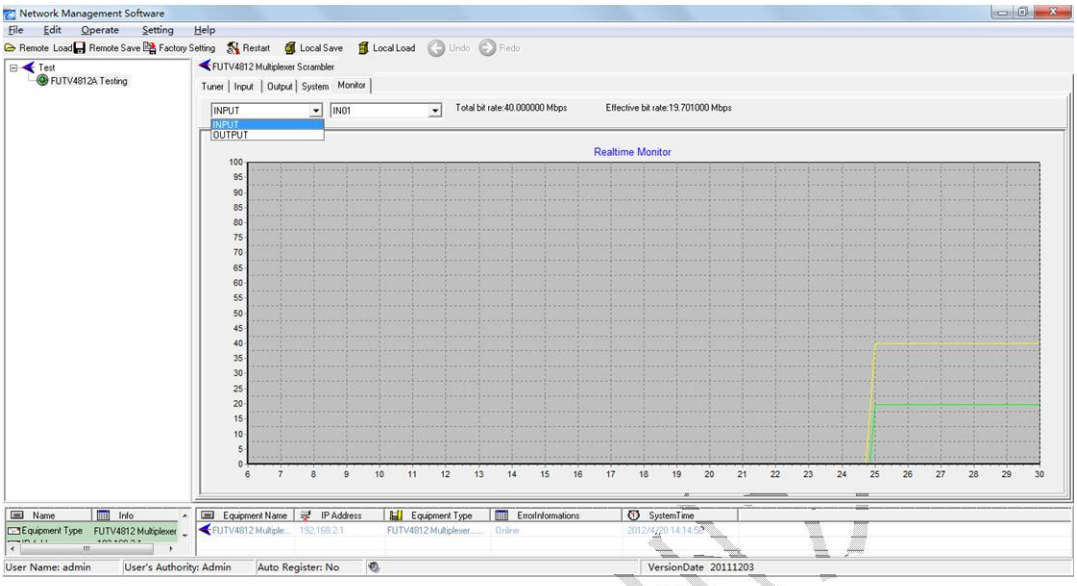
PSI/SI Editor:

PSI: Program Specific Information

SI: Service Information

This button will trigger the PSI/SI Editor for some users' advanced usage.

4.3.5 Real-time Monitor



The real-time effective bit-rate of output stream and the number of output programs of both the output Port 1 and Port 2 will be directly displayed at this chart. User can also clearly observe the output stream real-time effective bit-rate changing on the following dynamic trend chart.

NOTE: After completion of configration of all the parameters, click Remote Save button

on the toolbar to save the modifications to the device's flash.

Chapter 5 Troubleshooting

FMUSER's ISO9001 quality assurance system has been approved by CQC organization. For guaranteeing the products' quality, reliability and stability, all FMUSER products pass the testing and inspection before products are shipped out factory. The testing and inspection scheme already covers all the Optical, Electronic and Mechanical criteria which have been published by FMUSER. To prevent potential hazard, please strictly follow the operation conditions.

Preventive Measures

- Installing the device at the place in which environment temperature is between 0 to 45 °C
- Making sure good ventilation for the heat-sink on the rear panel and other heat-sink bores if necessary
- Checking the input AC within the power supply working range and the connection is correct before switching on device
- Checking the RF output level varies within tolerant range if it is necessary
- Checking all signal cables have been properly connected
- Frequently switching on/off device is prohibited; the interval between every switching on/off must be greater than 10 seconds.

Conditions need to unplug the power cord

- Power cord or socket damaged.
- Any liquid flowed into device.
- Any stuff causes circuit short
- Device in damp environment
- Device was suffered from physical damage
- Longtime idle.
- After switching on and restoring to factory setting, device still cannot work properly.
- Maintenance needed

Chapter 6 Packing list

- FUTV4812A multiplexer scrambler 1pcs
- User's manual 1pcs
- ASI Cable 1pcs
- Power Cord 1pcs

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